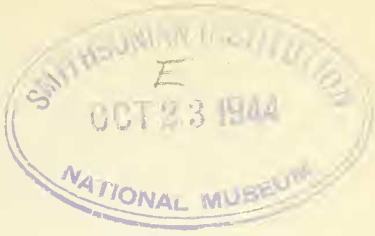

ART. VII. *BRACHYURANOCHAMPSA EVERSOLEI*, GEN. ET SP. NOV., A NEW CROCODILIAN FROM THE WASHAKIE EOCENE OF WYOMING

By Rainer Zangerl
University of Notre Dame

(Plates I-III)

Among the specimens collected by the Carnegie Museum in the Washakie Eocene of southern Wyoming in 1941, there is an exceptionally well preserved crocodilian skull, recently prepared by the writer. The specimen is very nearly complete; the lower jaws, however, are missing. It may be described as follows:

Brachyuranochampsa* eversolei, gen. et sp. nov.

Type: Skull, Carnegie Museum number 9,372; collected by the Carnegie Museum Expedition of 1941.

Type locality: Washakie Basin one-half mile east of road between Bitter Creek and Baggs, about ten miles south of Kinney Ranch; Sweetwater County, Wyoming.

Horizon: Middle Washakie.

Diagnostic characters: The skull is triangular in shape; the fifth pair of maxillary teeth is largest, exceeding the fourth pair but slightly in size; both are considerably larger than any of the remaining maxillary teeth. The palatine elements are short, they do not reach the rostral margins of the posterior palatine vacuities and the palato-maxillary suture is anteriorly concave. The rear maxillary teeth are short and blunt while the anterior ones are conical and slightly curved. Unusually large and deep pits for the reception of mandibular teeth are located between maxillary teeth 7 and 8; smaller ones are clearly visible on both sides between teeth number 6 and 7, and 8 and 9. The supratemporal fenestrae are almost

*βραχύς, short; οὐρανός, roof of mouth, palate (Aristot., Hist. Anim.) Χάμψα, crocodile (Herodotus).

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perfectly circular and are close together. The orbits are longer than broad and rather pointed in front. The interorbital plate is separated from the basis of the snout by a low, V-shaped ridge. The supraoccipital forms part of the cranial table. The nasal elements reach to the rear border of the external narial aperture, but do not extend into it.

During the very first stages of preparation a peculiar character was observed which appears to be unique among recent as well as fossil crocodilians. This concerns the shape of the palato-maxillary suture. Normally this suture is anteriorly convex, separating to a greater or lesser degree the posterior portions of the ventral horizontal wings of the maxillaries. In the form described here, the suture is anteriorly concave and does not reach to the forward margins of the palatine fenestrae. In other respects the skull greatly resembles such forms as *Leidyosuchus* and *Prodiplocynodon* from the Lance formation. The unusual combination of characters in the present specimen seems to justify the proposal of the new genus and species.

The species is dedicated to Mr. and Mrs. Roy Eversole of Bitter Creek, Wyoming, whose splendid hospitality and interest in our field work contributed greatly to the successful completion of our assignment. The writer wishes to thank Dr. J. LeRoy Kay and Dr. John Clark of the Carnegie Museum for the privilege of describing one of the results of the field work of the season of 1941.

Preservation: The skull was lying dorsal side down in the formation and was embedded in a fine clay. The extreme tip of the snout was exposed and a small portion of it was missing. No remains of the lower jaws or the postcranial skeleton could be found. The state of preservation was good; the roof of the skull shows very little, if any, deformation, but the pterygoids, ectopterygoids, palatines, and the ventro-medial wings of the maxillaries, were crushed and were cemented to the ventral surfaces of the roof bones of the skull. Fortunately the dislocation of these elements did not cause them to be greatly deformed and the bones in question could be placed approximately into their former positions. The ectopterygoids alone seem to have been somewhat flattened and could therefore not be brought into contact with the maxillaries. The palatines were uninjured except for a few transverse cracks.

General features of the skull: The outline of the specimen approaches very closely that of a modern crocodile skull, *e. g. Crocodilus porosus;* both the horizontal and the vertical festooning are pronounced, but not extreme. The notches at the premaxillary-maxillary sutures are rela-

tively deep. The snout is very flat and the surfaces of the cranial table and the basis of the snout decline rostrad to about the level of the fifth maxillary teeth; from there the roof of the snout ascends gently to a point near the posterior border of the external nasal opening. The very tip of the rostrum is slightly bent downwards. The quadrates are unusually high in position, particularly their distal ends which are not bent ventrad as in recent forms. There is no sign whatever that this condition might be due to crushing. The cranial table is considerably wider than long and the interorbital plate is quite narrow. The sculpturing of the skull surface is pronounced but not characteristic.

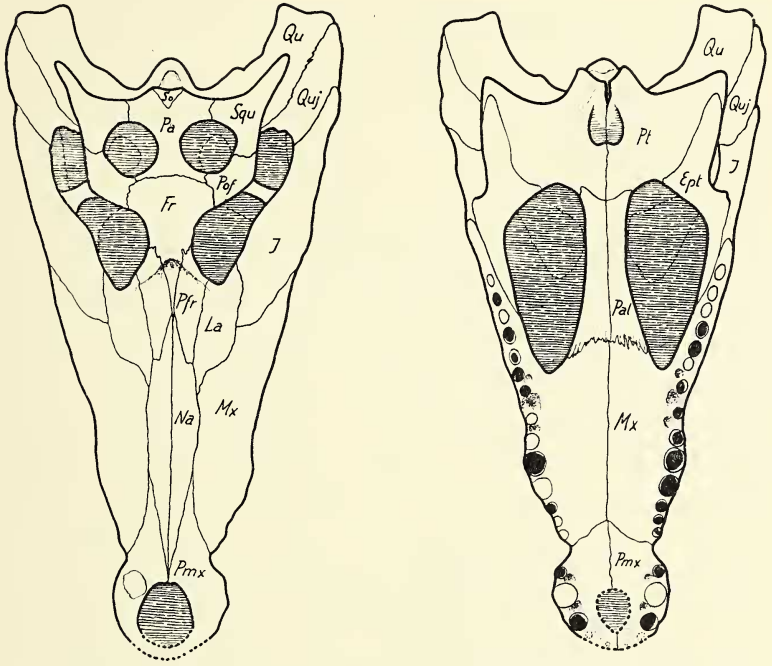

FIG 1. *Brachyuranochampsa eversolei*. Dorsal view (left) and Ventral view (right) of skull of type.

Bones of the skull: The sutures could be traced fairly well in all parts of the skull. The premaxillaries, of which the most anterior tips are missing, possess dorsally long, narrow processes reaching to the level of the fifth maxillary teeth. On the ventral side the premaxillary-maxillary suture is

V-shaped with the apex of the V not extending farther back than the region of the second maxillary teeth. Three alveoli, the first and last containing broken teeth on both sides, are preserved. Of the three alveoli in each premaxillary the last one is by far the smallest; the second last is unusually large. On the right side of the specimen the alveolus is open dorsally and the bone in the immediate neighbourhood is distinctly discoloured, a condition which might have been caused by an infection. The first preserved premaxillary alveolus is intermediate in size between the other two. Between this alveolus and its large neighbour there is a deep pit presumably for the reception of the second mandibular tooth. Another, more shallow, pit is situated between the middle and the last premaxillary alveoli. These pits do not separate the alveoli but are somewhat removed mediad from the tooth line.

The maxillaries carry fourteen alveoli each. Ten teeth are preserved on the right, and seven on the left side of the specimen. In most cases, however, only the roots are preserved. The alveoli of the fourth and fifth teeth are the largest in the series; the latter exceed the former but slightly in size. There are very large interdental spaces between the alveoli 6 and 7, 7 and 8, and 8 and 9. Remarkably deep pits are located in these spaces, apparently for the reception of large mandibular teeth. The largest of these pits lies between alveoli 7 and 8 (text-fig. 2). The anterior alveoli are approximately circular in outline, while the posterior ones are longer than wide. In the front portion of the maxillary the teeth appear to have been conical and anteriorly and posteriorly crested. In the rear part of the jaw the crowns are low and obtuse. Of particular interest is the maxillary-palatine suture. Although the ventral horizontal wings of the maxillaries are crushed, there is no doubt as to the course of this suture. It lies relatively far back at a point where the palatina are still thick. The suture itself is complicated and anteriorly concave (text-fig. 2 and plate II). It lies behind the tips of the palatine vacuities. Mook (1941) could not make out the suture in question in his recently described *Prodiplocynodon langi*, a genus which seems to be fairly closely related to the present one. It is, however, very unlikely that the two forms are identical in regard to the palato-maxillary suture, because if it were developed in *Prodiplocynodon* as it is in *Brachyuranochampsa*, Mook could not possibly have failed to observe it. The maxillary-nasal suture is unusually short, partly because of the long posterior premaxillary processes and also because of the length of the lacrymal.

The nasals reach their greatest width at the level of the seventh maxil-

lary teeth. Their posterior tips are but slightly separated by the rostrad process of the frontal. The latter bone does not extend to the anterior rims of the supratemporal fenestrae. Behind these openings the parietal plate is wide, as in the Leidyosuchidae, and a triangular process of the supra-occipital takes part in the formation of the cranial table.

The shape of the quadrato-jugal is more nearly crocodiloid than alligatoroid; an antero-mediad process of this bone accompanies the aboro-medial margin of the infra-temporal fenestra, but does not exclude the quadrate from forming part of the rim of the opening; the presence of a so-called spina quadrato-jugalis is doubtful, for the edge of the opening at that point is slightly insured.

The interorbital plate is separated from the basis of the snout by a low, V-shaped bone wall as in *Prodiplocynodon langi* Mook, but it is more weakly developed than in the latter form.

The palatines are short. Their narrowest region lies at the level of the 14th maxillary teeth. The posterior processes of the pterygoids near the median plane are very large, but different in shape from those in *Prodiplocynodon.*

Openings of the skull: The orbits face upward and slightly forward. They are almost twice as long as wide and differ in shape from those in *Prodiplocynodon.* The inner margins are rounded, the outer boundaries are concave laterad in the posterior parts of the orbits, convex in the anterior portions (text-fig. 1). In front the orbits are considerably pointed.

The supratemporal fenestrae are almost perfectly circular. They are moderately far apart and their margins are somewhat elevated medially. The lower temporal vacuities are relatively large, and particularly long. As previously stated, they are posteriorly framed by the quadrato-jugals and the quadrates.

The external nasal opening is not totally preserved. The portion present resembles very much that of *Prodiplocynodon* except that the nasal elements do not enter the opening in *Brachyuranochampsa.*

Nothing can be said about the premaxillary foramen. As shown here (text-fig. 1), it was reconstructed after *Prodiplocynodon langi* Mook. The shape of the palatine fenestrae seems to be very similar to that in *Prodiplocynodon.* The openings are large; anteriorly they reach to a point opposite maxillary teeth number nine.

The internal narial aperture is relatively large, its anterior border lies at about mid-length of the pterygoids, a position quite similar to that in *Leidyosuchus sternbergii* Gilmore.

COMPARISON OF BRACHYURANOCHAMPSA WITH RECENT CROCODILIANS

In a series of extensive studies on the morphology of the skull of recent crocodilians, Kälin (1931, 1933, 1936) distinguishes two families: the Gavialidae and the Crocodilidae. The latter group was subdivided into the subfamilies: Alligatorinae and Crocodilinae. Kälin's characterization of the two subfamilies (*op. cit.* 1933) leaves no doubt that *Brachyuranochampsa* belongs to the Crocodilinae. Among the recent forms of true crocodiles, the new fossil resembles most closely *Tomistoma schlegeli*, if one disregards the enormously elongated snout of the latter. The two forms seem to resemble one another in a number of features which appear to be typical for *Tomistoma* among the recent crocodilians, such as the shape of the orbits and that of the palatine vacuities, the long, posterior premaxillary processes in the roof of the snout and, most conspicuous of all, the shape of the palatines and the development of the palato-maxillary suture. It is doubtful, but not altogether impossible, that *Brachyuranochampsa* actually belongs to the general "Formenkreis" of *Tomistoma*. The fact that the fossil is distinctly short-snouted should be of no concern in this connection since the genus *Gavialis*, too, contains long-snouted and short-snouted forms (*Gavialis gangeticus* Gmelin and *G. breviceps* Pilgrim).

One of the chief similarities between *Tomistoma* and *Gavialis* is the participation of the splenialia in forming the symphysis. Kälin (1936) suggests the possibility that *Tomistoma* might have originated directly from the older opistochoan crocodiles (*Leidyosuchus*, *Brachychampsa*) in which the splenialia quite generally take part in the formation of the symphysis. Since this feature is not known in *Brachyuranochampsa*, more complete specimens may be necessary to decide upon the validity of the present assumption of a closer genetic relationship of this form with *Tomistoma*.

TABLE OF MEASUREMENTS

Greatest width between quadrato-jugals	219	mm.
Width at basis of snout	164	mm.
Width at level of 5th maxillary teeth	104	mm.
Width at maxillary-premaxillary notch	54	mm.
Greatest width of premaxillary region	75	mm.
Width between anterior tips of orbits	64.5	mm.
Narrowest point of interorbital plate	26	mm.
Anterior width of cranial table	106	mm.
Posterior width of cranial table	126	mm.
Narrowest point between supratemporal fossae	13.5	mm.
Greatest width of supratemporal fossa	34.5	mm.
Greatest width of orbits	35	mm.
Greatest width of external narial opening	29	mm.
Narrowest point between palatine vacuities	26	mm.
Width between anterior tips of palatine vacuities	69.5	mm.
Width of internal narial aperture	18.5	mm.
Length, occipital condyle to tip of snout (estimated)	390	mm.
Length, posterior border of cranial table to tip of snout (est.)	365	mm.
Length, posterior border of cranial table to posterior rim of external nasal opening	313	mm.
Length, posterior border of cranial table to premaxillary notch	294	mm.
Length, posterior border of cranial table to basis of snout (level of anterior rims of orbits)	125	mm.
Length between anterior tip of orbit and deepest saddle point of quadratal joint surface	189	mm.
Length of orbit	65	mm.
Length of supratemporal fenestra	36	mm.
Length of palatine fenestrae (approximately)	120	mm.

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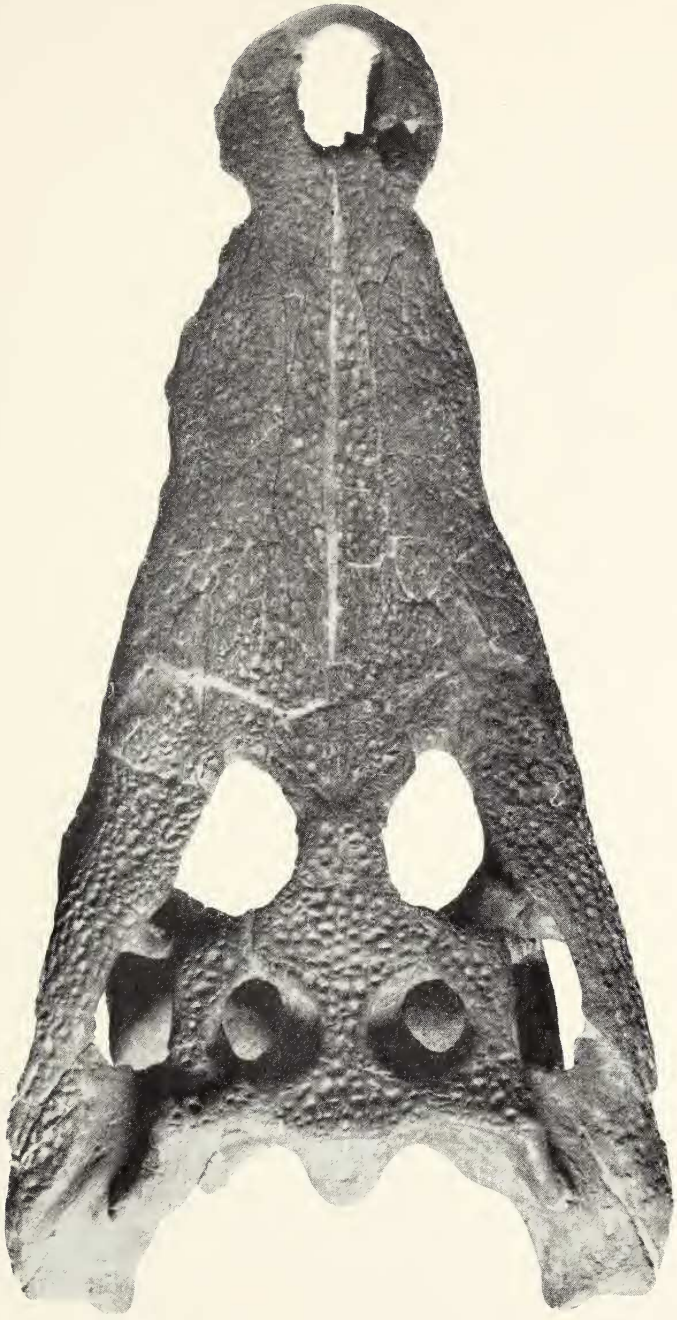
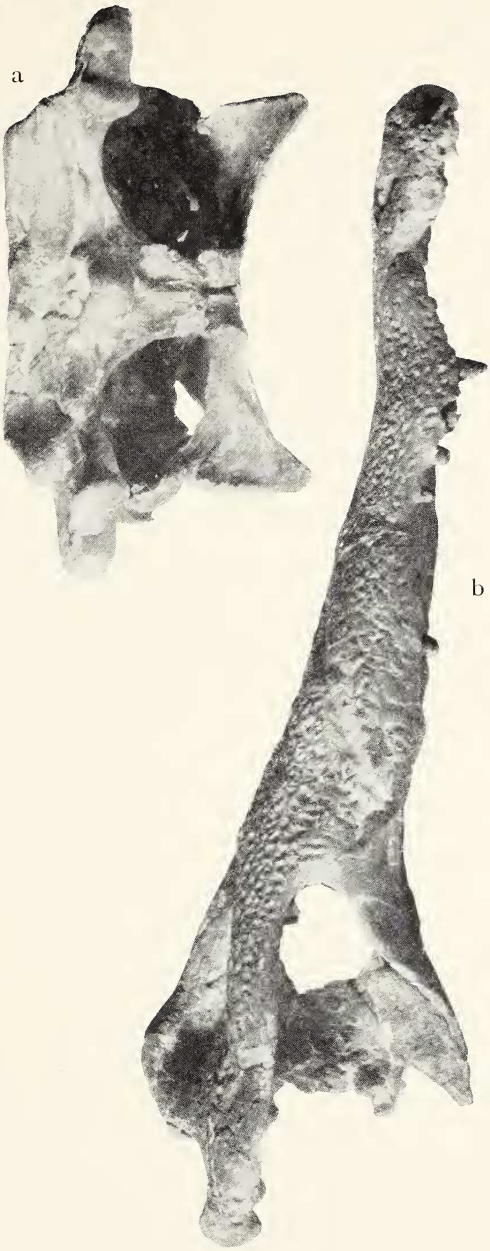


Brachyuranochampsa eversolei. Type.
Dorsal view of skull. About two-fifths natural size.

Brachyuranochampsa eversolei. Type.
Ventral view of skull. About two-fifths natural size.



Brachyuranochampsa eversolei. Type.
a. Posterior view of skull.
b. Lateral view of skull, right side.
All figures about two-fifths natural size.